Development and evaluation of a low cost homemade starter on growth performances of Sasso breed and indigenous chicks

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Abstract. The effects of substitution of different levels of commercial starters with a homemade ration on the growth performance of Sasso and indigenous chicks were studied in Hiruy Abaregay kebele of Farta Woreda, Ethiopia. The research area is located at a distance of 586 km from the capital city of Addis Ababa, Ethiopia. A total of 450 Sasso T-44 and 150 indigenous local ecotypes of chicks were randomly divided into five groups, each with 90 and 30 chicks, respectively. These were assigned to five dietary treatments, partially to totally replacing the commercial starter feed: control - 100% starter feed (T1), 75% starter feed (T2), 50% starter feed (T3), 25% starter feed (T4), and 0% starter feed (T5). A factorial completely randomized design (CRD) with 3 replications for 60 days feeding period was used. The results obtained indicated that increased levels of substitution of a commercial diet with a homemade diet significantly depressed ($p<0.001$) the mean daily feed consumption and retention of dry matter, nitrogen, and metabolizable energy. Growth rate as measured by mean daily weight gain, mean final body weight, total feed consumption and feed cost were significantly lower ($p<0.001$) when using high proportions of homemade diet. On the contrary, there was an increase in feed conversion ratio and fiber content in the high-level dilution of starter commercial diet with a homemade diet. However, the groups of chicks in T5, T4 and T3 had a significantly higher ($p<0.001$) mean daily feed intake, daily weight gain, feed conversion ratio, and final body weight attained. The results of this study indicated that up to 50% of expensive commercial starter's diet could economically be replaced with the low cost homemade diet without adversely affecting the growth performance of chicks.
Key Words: breed, diet, growth, indigenous, intake, Sasso.

Introduction. In Ethiopia chicken plays a significant socio-economic role in the provision of human food, family income and in the use of religious/cultural ceremonies of the society (Alemu et al 2009). Indigenous chicken-based village poultry production provides a major income-generating activity from the sale of live birds and eggs. Village poultry production is a source of self-reliance for women, since the sale of live birds and eggs is decided by women (Aklilu et al 2007), both of which provide women with an immediate income to meet various expenses. Moreover, small-scale modern poultry are widely kept by the urban and peri-urban population (Dessie & Ogle 2001). Currently, the Ethiopian government, FAO, several Donor & NGOs funded projects are involved in the implementation of small scale poultry development plans to support vulnerable households and jobless youth. Unfortunately, the major bottleneck of both the village and small scale modern poultry production system is poor quality and high cost of feed (Yitbarek & Atalel 2013).

There is no purposeful feeding of chickens under the backyard village production system in Ethiopia and scavenging is almost the only source of food. The scavenging feed resource base is variable depending on the season (Yami & Dessie 1997; Youssao et al

2012). The processed chicken feed consisting mainly of cereal grains, cereal grain by-products, and oilseed cakes are largely concentrated in larger towns and their vicinity (Yami & Dessie 1997). The lack of regional feed mills adds transportation costs. Thus, there is a strong need for the setup of feed packages aimed at developing low-cost regional poultry rations with the use of locally available feed resources. Therefore, the specific objectives of this study were: to develop a low-cost starter's diet from locally available ingredients in South Gondar zone of Amhara Regional State; to evaluate the homemade low cost starter's diet on growth performance of Sasso breed and indigenous chicks in South Gondar zone of Amhara Regional State; and to assess the economic feasibility of the inclusion of the homemade starters diets into the village chicken production system.

Material and Method

Experimental dietary treatments formulation. The low cost homemade diet was formulated by using locally available feed ingredients. Maize, wheat, sorghum, millet and barley grains were used as energy sources, while wheat bran and Noug seed cake were used as source of proteins. These were purchased from the local market and transported to the study area. Commercial starter's diet was purchased from Andasa Ethio-chicken poultry farm and transported to the study site to be used as the positive control ration. Representative samples of all the feed ingredients and the commercial starter were milled to pass through 1 mm sieves and stored in airtight containers until laboratory analyses. The dry matter (DM), crude protein (CP), ether extract (EE), crude fat (CF), crude fiber (CF), and total ash were determined according to (AOAC 1990). The metabolizable energy (ME) content of all the samples was estimated using regression and summation equations (Abas et al 2005; Palic et al 2012). The low cost homemade starter is presented in Table 1. (T5) was formulated based on the result of the laboratory analytical data. The low cost homemade starter was formulated using winfeed 2.8 software, from ingredients available in any ordinary household and contained 2955 kcal kg^{-1} and 19.39% protein. The energy and protein content of the homemade diet was adjusted with that of the commercial starter.

Table 1

Composition of the experimental diet

Ingredients	*Ingredients composition/proportion/*				
	T1	*T2*	*T3*	*T4*	*T5*
Maize	0	8.2	16.4	24.6	32.8
Wheat bran	0	6.1	12.2	18.3	24.4
Noug seed cake	0	5.8	11.6	17.4	23.2
Wheat grain	0	2.2	4.4	6.6	8.8
Sorghum grain	0	1.2	2.4	3.6	4.8
Millet grain	0	1.2	2.4	3.6	4.8
Barley grain	0	0.3	0.6	0.9	1.2
Commercial feed	100	75	50	25	0

Note: T1- 0% low cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low cost diet.

Management of the experimental chicks. A total of 450 Sasso T-44 breed chicks (1 day old) were purchased from Andasa Ethio-chicken poultry farm and 150 indigenous local ecotype chicks (1 day old) hatched with the use of 15 thoroughly broody hens were used. All chicks were individually weighed, vaccinated, and divided into five groups each with 90 Sasso T-44 and 30 indigenous chicks. All groups of chicks were placed in clean, disinfected and prepared hay box brooders. The hay box brooders were constructed from locally available materials as suggested by Demeke (2007). The chicks were vaccinated against Newcastle, Gumboro, and Marek's diseases. Finally, the chicks were assigned to 5 dietary

treatments in a factorial completely randomized design with 3 replications (Table 2). Feed consumption was measured daily, whereas body weights were measured weekly.

Table 2

Treatment allocation to the experimental chicks

Treatments	*Sasso Chicks*	*Indigenous chicks*	*Repetition per treatment*	*Sasso per repetition*	*Indigenous per repetition*
100% Commercial starter's diet (T1)	90	30	3	30	10
75% Commercial + 25% Homemade starter diet (T2)	90	30	3	30	10
50% Commercial + 50% Homemade starter diet (T3)	90	30	3	30	10
25% Commercial +75% Homemade starter diet (T4)	90	30	3	30	10
100% Homemade starter diet (T5)	90	30	3	30	10

Data collection. The feeding trial lasted for 8 and 24 weeks for Sasso and indigenous chicks, respectively. The major data collected included feed intake, daily weight gain and final body weight attained. The partial budget analysis was done according to Upton (1979) to determine the comparative economic feasibility of the commercial and homemade starter diets studied. Chick's market price, feed cost and profits were considered. The net income (NI) was calculated by subtracting total variable cost (TVC) from the total return.

The change in net income (ΔNI) was expressed as the difference between the change in total return (ΔTR) and total variable cost (ΔTVC)

The marginal rate of return (MRR) measures the increase in net income (ΔNI) related to each additional unit of expenditure (ΔTVC) and expressed in the percentage.

Statistical analyses. All data collected were subjected to statistical analysis of variance using the PROC GLM of Statistically Analysis software SAS 9.2 version (SAS 2008). The Least Significant Difference (LSD) was used to locate treatment means. The following model was used to test the growth performance of the chicken affected by types of breed, types of diet, and their interaction.

$$Y_{ij} = \mu + B_i + R + BR_{ij} + \varepsilon ij - - - - - - - - 1$$

Where: Y_{ij} - the i^{th} observation of i^{th} breed (B), the j^{th} ration (R); μ - the general mean; B_i - the effect of level *i* of factor breed (B); R_j - the effect of level *j* of factor ration (R); $(BR)_{ij}$ - the effect of level *ij* of factor interaction between breed and ration; ε_{ij} - the random error associated with Y_{ij} observation.

Results and Discussion

Chemical composition of the experimental diet. The proximate composition and metabolizable energy contents of the experimental diets are presented in Table 3. The dry matter of the treatments ranged between 91 and 94%, while the crude proteins ranged between 18-20.9%. The lowest crude fiber (4%) content was obtained in the commercial starter ration followed by that of T2 and T3, respectively. Higher levels of crude fiber were recorded from homemade starter's ration. The percentage of the ether extracts of the rations tended to be similar to that of the crude fiber contents. The metabolizable energy contents of the treatment diets are comparable and ranged between 2875 and 3035 kcal

kg^{-1}. The presented composition is above the requirements of experimental chicks (Barekatain et al 2021).

Table 3

Chemical composition of the experimental diets

Chemical analysis of the diet					
Nutrients	*T1*	*T2*	*T3*	*T4*	*T5*
DM %	94.2	94	93.6	92	91
CP% DM bases	20.9	20.3	19	18.7	18
CF% DM bases	4	4.5	6.4	8.5	10
EE% DM bases	3	3.8	5.4	5.8	6
ME kcal kg^{-1}	3035	3000	2975	2890	2875

Note: T1- 0% low-cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low-cost diet.

Feed consumption. The results of the mean feed consumption of the experimental chicks are presented in Tables 4 to 6. The mean daily and weekly feed consumption of the indigenous chicks in all four experimental treatments were significantly lower ($p<0.05$) than that of the Sasso T-44, during the first four weeks of the brooding period (Table 4). There was no significant difference ($p>0.05$) among the groups of Sasso T-44 chicks fed on the 5 treatments during the first 4 weeks of the brooding period in mean daily and weekly feed consumption, indicating that the feeding value of the homemade starter is comparable to that of the commercial starter. On the contrary, the mean daily and weekly feed consumption of the indigenous groups fed on the homemade ration was significantly lower ($p<0.05$) than that of the indigenous groups fed on either commercial or different combinations of commercial and homemade diets. Moreover, the mean total feed consumption of the Sasso treatment groups was significantly higher than that of the indigenous treatment groups during the first 4 weeks of the brooding period (Table 4).

The results of the mean feed consumption of the chicks from the experimental treatments during the second 4 weeks of the brooding period are presented Table 5. There was no significant difference ($p>0.05$) among the Sasso treatment groups on one side and the indigenous treatment groups on the other sides in mean daily, weekly and total feed consumption of the brooding period. Nevertheless, the Sasso treatment groups presented significantly higher values ($p<0.05$) than that of the indigenous treatment groups for mean, daily, weekly and total feed consumption during the second 4 weeks of the brooding period. The Sasso T-44 treatment groups and the indigenous treatment groups achieved overall mean daily feed consumption of 43 and 19 g h^{-1} on the 8^{th} week of the brooding period, respectively. The feeding trial with the indigenous experimental chicks was extended beyond the brooding period of 8 weeks. The indigenous groups fed on the commercial starter achieved a mean daily feed consumption of 50 g h^{-1} during the 9-24 weeks of age. The indigenous groups fed on the starter ration containing either 25, 50 or 75% commercial starter attained a daily feed consumption of 41 g h^{-1} during the 9-24 weeks of age, while the indigenous groups fed on homemade starter attained a mean daily feed consumption of 33.9 g h^{-1} during the 9-24 weeks of age.

The mean daily feed consumption (MDFC), mean weekly feed consumption (MWFC) and mean total feed consumption (MTFC) was significant ($p<0.001$) among the breeds during the second four weeks (5-8 weeks). The MDFC, MWFC, and MTFC for the indigenous ecotype during 9-24 weeks fed homemade rations was significantly ($p<0.001$) lower than birds fed the 25, 50, 75, and 100% commercial diet. The fiber content of the diet was increased from 4% to 10% when the homemade low-cost inclusion increased as presented in Table 3. However, the feed intake decreased when the inclusion of the homemade low-cost diet increased in the diet.

Growth performance. The results of the growth performance of the chicks from the experimental treatments were presented in Tables 4 to 6. The overall mean initial body weight of Sasso T-44 and indigenous chicks was 53 and 26 g, respectively, indicating that the mean hatching weight of the indigenous chicks was 49.1% of that of Sasso T-44 chicks. There was no significant difference ($p>0.05$) between the treatment groups of indigenous chicks in mean daily, weekly and total body weight gain during the first 4 weeks of the brooding period. On the contrary, the mean daily, weekly and total body weight gain of the groups of Sasso chicks assigned to homemade starter was significantly ($p<0.001$) lower than that of the other Sasso treatment groups. The Sasso groups fed on the starter ration containing 25, 50, 75 and 100% commercial starter attained a final body weight of 181.1, 172.6, 232.6 and 228.5 g at an age of 4 weeks, respectively, without showing significant difference ($p>0.05$) among the treatments. The Sasso groups assigned to homemade starter reached a mean body weight of 108.1 g at an age of 4 weeks, about 47% of that of the groups assigned to commercial starter at an age of 4 weeks.

There was no significant difference ($p>0.05$) between the indigenous treatment groups in mean daily, weekly, total body weight gains and mean final body weight during the first 4 weeks of the brooding period. The Sasso treatment groups attained an overall mean of 185 g at an age of 4 weeks. The indigenous treatment groups attained an overall mean of 52.4 g at an age of 4 weeks, 28% of that of the overall mean of the Sasso treatment groups at an age of 4 weeks. There was no significant difference ($p>0.05$) between the Sasso treatment groups fed on the starter ration containing 25, 50, 75 and 100% commercial starter in mean final body weight attained at an age of 8 weeks. However, the mean final body weight of the Sasso groups fed on homemade starter ration was significantly ($p<0.05$) lower than that of the other Sasso treatment groups at an age of 8 weeks. There was no significant difference ($p>0.05$) between the Sasso groups fed on homemade starter and the indigenous groups fed on the starter rations containing 25, 50, 75 and 100% commercial starter in mean daily, weekly and total body weight gain and in mean final body weight during the second 4 weeks of the brooding period.

The mean daily body weight gain (MDBWG) in the present study was similar to body weight gains reported by other authors (Pettersson & Aman 1989; Ojewola et al 2004; Demeke 2004; Melkamu et al 2017). However, it was different from the mean final body weight (MFBW) findings on Bovan Brown chicken performance under backyard management system. The growth performance of chicken under 75-100% homemade starter's ration was depressed due to high fiber content and low nutritive value (Doku & Karikari 1981; Apata & Qlophobo 1994; Ensminger et al 1990). In the current study, the mean weekly body weight gain (MWBWG) of Sasso breed was higher than in the study of Radikara et al (2016), but that of the indigenous chicks was lower than that of Botswana chicken fed commercial diet for 18 weeks. The growth rate of chicken is usually progressive, incremental with the advancement of age within the Sasso breed and indigenous eco-type, which is also true in the present study. The MFBW and MDBWG of indigenous breed under intensive production system (Demeke 2004) was lower than in the current study. However, MFBW was lower than the report of Oyeagu et al (2015) on broiler growth performance.

Table 4

Mean feed consumption and growth performance of Sasso and indigenous chicks during the first 4 weeks

Parameters	*Sasso T-44*					*Indigenous*					*p-value*
	T1	*T2*	*T3*	*T4*	*T5*	*T1*	*T2*	*T3*	*T4*	*T5*	
Daily intake at 1st 4 weeks (g)	20.4[a]	19.7[a]	21.0[a]	29.1[a]	22.7[a]	10.3[a]	8.6[a]	8.1[a]	7.4[a]	6.6[b]	0.05
Weekly intake at 1st 4 week (g)	143.4[a]	138.1[a]	147.6[a]	204.1[a]	158.9[a]	72.3[a]	60.2[a]	56.7[a]	52.4[a]	46.8[b]	0.05
Total intake at 1st 4 week (g)	17718.0[a]	18937.1[a]	19115.9[a]	28607.2[a]	21655.9[a]	1440.5[b]	1549.5[b]	1275.0[b]	1322[b]	1070.0[b]	<0.001
Mean initial weight (g)	56.5[a]	53.3[a]	48.8[a]	56.8[a]	50.0[a]	26.2[b]	26.6[b]	24.3[b]	25.5[b]	25.8[b]	<0.001
Mean final weight at 4th w (g)	228.5[a]	232.6[a]	172.6[a]	181.1[a]	108.1[b]	51.5[b]	51.7[b]	52.5[b]	55.1[b]	51.4[b]	<0.001
Mean daily gain 1st 4 weeks (g)	3.9[a]	4.1[a]	3.3[a]	3.3[a]	2.4[b]	1.2[c]	1.2[c]	1.2[c]	1.5[c]	1.2[c]	<0.001
Mean weekly gain 1st 4 week (g)	29.9[a]	30.9[a]	24.8[a]	24.8[a]	18.2[b]	9.6[c]	9.4[c]	9.4[c]	11.5[c]	9.4[c]	<0.001
Mean total gain 1st 4 week (g)	3441.6[a]	3964.8[a]	2999.0[a]	3291.4[a]	2337.9[b]	184.4[c]	227.8[c]	201.6[c]	272.0[c]	203.7[c]	<0.001
Mean FCR 1st 4 weeks	1.2	1.2	1.5	2.9	2.0	2.8	3.0	3.0	3.0	3.0	0.65

Note: FCR - feed conversion ratio; T1- 0% low-cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low-cost diet; different letters show significant differences.

Table 5

Mean feed consumption and growth performance of Sasso and Indigenous chicks during 5-8 weeks

Parameters	*Sasso T-44*					*Indigenous*					*p-value*
	T1	*T2*	*T3*	*T4*	*T5*	*T1*	*T2*	*T3*	*T4*	*T5*	
Daily intake 5-8 weeks g/head	43.8[a]	42.4[a]	42.3[a]	43.0[a]	42.2[a]	18.7[b]	21.1[b]	18.8[b]	18.7[b]	19.7[b]	<0.001
Weekly intake 5-8 weeks (g/head)	306.9[a]	296.9[a]	296.5[a]	301.0[a]	295.7[a]	130.9[b]	147.9[b]	132.0[b]	130.9[b]	138.5[b]	<0.001
Total intake 5-8 weeks (g/head)	36502.1[a]	39428.9[a]	36463.5[a]	41483.7[a]	33547.2[a]	1899.2[b]	2769.6[b]	2317.5[b]	2208.5[b]	2591.4[b]	<0.001
Mean initial weight on 5th week (g)	319.7[a]	319.7[a]	280.0[a]	280.6[a]	114.9[b]	63.6[b]	62.7[b]	62.4[b]	68.7[b]	59.6[b]	<0.001
Mean final weight on 8th week (g)	708.7[a]	590.0[a]	518.0[a]	484.0[a]	172.6[b]	115.6[b]	104.2[b]	104.4[b]	118.1[b]	77.1[b]	<0.001
Mean daily gain 5-8 weeks (g/head)	17.2[a]	13.9[a]	13.0[b]	12.6[b]	4.9[c]	3.0[c]	2.8[c]	2.8[c]	3.1[c]	2.2[c]	<0.001
Mean weekly gain 5-8 weeks (g/head)	129.5[a]	104.4[a]	98.1[b]	94.6[b]	37.3[c]	22.5[c]	21.0[c]	21.2[c]	23.5[c]	17.0[c]	<0.001
Mean total gain 5-8 weeks (g/head)	14263.8[a]	13061.8[a]	12206.0[b]	10758.5[b]	3977.2[c]	305.8[d]	385.9[d]	337.9[d]	375.0[d]	294.5[d]	<0.001
Mean FCR 5-8 weeks	0.6[a]	0.7[a]	0.8[a]	0.8[a]	2.1[b]	1.9[b]	2.4[c]	2.2[b]	2.0[b]	2.9[d]	<0.001

Note: FCR - feed conversion ratio; T1 - 0% low-cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low-cost diet; different letters show significant differences.

Table 6
Mean feed consumption and growth performance of Indigenous chicks during 9-24 weeks

Parameters	*Indigenous*					*p-value*
	T1	*T2*	*T3*	*T4*	*T5*	
Daily intake 9-24 weeks (g)	50.1[a]	41.9[b]	38.4[b]	41.8[b]	33.9[c]	<0.001
Weekly intake 9-24week (g)	1403.4[a]	1175.2[b]	1075.8[b]	1172.9[b]	951.0[c]	<0.001
Total intake 9-24 weeks (g)	18043.9[a]	15110.0[a]	14058.6[b]	15080.8[b]	12344.2[c]	<0.001
Mean initial weight 9th W (g)	131.3[a]	115.1[a]	116.1[a]	128.4[a]	87.1[b]	<0.001
Mean final weight 24th W (g)	733.6[a]	635.3[b]	595.0[c]	525.3[d]	446.5[e]	<0.001
Daily gain 9-24 weeks (g)	3.3[a]	2.5[b]	2.5[b]	2.4[b]	1.9[c]	<0.001
Weekly gain 9-24 week (g)	24.8[a]	19.3[b]	19.2[bc]	18.4[c]	14.6[d]	<0.001
Total gain 9-24 weeks (g)	1191.3[a]	928.3[b]	928.6[b]	885.4[c]	709.0[d]	<0.001
Mean FCR 9-24 weeks	3.4[c]	4.13 [b]	4.5[b]	4.7[b]	5.7[a]	<0.001

Note: FCR - feed conversion ratio; T1 - 0% low-cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low-cost diet; different letters show significant differences.

Feed conversion ratio (FCR). The results of the feed conversion ratio of the experimental chicks are presented in Tables 4 to 6. There was no significant difference ($p>0.05$) between the Sasso breed and indigenous chicks in mean FCR during the first 4 weeks of the brooding period. The mean FCR of the Sasso groups assigned to the homemade starter was significantly lower ($p<0.05$) than that of the other Sasso treatment groups during the second 4 weeks (5-8 weeks) of the brooding period. The indigenous groups fed on commercial starter had a significantly ($p<0.001$) higher mean FCR than the indigenous groups fed the other starter rations during the rearing period of 9-24 weeks. The FCR of the chicken in the current study had similar values with other reports under approximately the same chicken production system (Ojewola et al 2004; Demeke 2004; Tavares et al 2015).

Economic feasibility of the low-cost ration. The results of the relative economic feasibility of using the low-cost and commercial starter diets in raising Sasso and indigenous chicks are presented in Tables 7 and 8. The market price of the commercial starter was higher than the price of the homemade starter used in the current study. The results obtained indicated that Sasso groups fed on the treatment rations containing 50, 75 and 100% commercial starter were highly ($p<0.001$) profitable compared to the Sasso treatment groups fed on the treatments containing 0 and 25% commercial starter rations. The indigenous groups fed on all the treatments were not profitable as measured by net return. The results of the current study indicated that the indigenous ecotype kept under intensive production system was not profitable. This might be attributed to the occurrence of high mortality or death. The results of the current study are in agreement to that of previous studies. Indigenous chickens are considered to be disease resistant and adapted to their scavenging environmental conditions. Unfortunately however, indigenous chickens kept under the intensive system of management (in confinement) are inferior to exotic stocks in health status and characterized by a lack of interest in their environment, wing droppings, huddling at the corners, leg weakness and cannibalism. They are also slow in rate of feathering and exhibit recurrent outbreaks of disease (Demeke 2004).

The reason for the high mortality of local birds under the intensive management system is not clear, but it could be due to the fact that they are not used to confinement. Diseases, which are significant under confinement, such as coccidiosis, may have a greater effect in local stock than in exotic stock (Yami & Dessie 1997). The general indication is that this condition calls for a scientific study and explanation. At present, it could safely be said that local chickens are appropriate under the traditional production system with low input levels that make the best use of locally available resources.

Table 7

Mean economic feasibility of the low-cost diet for each treatment

Parameters market values (in Ethiopian birr)	*Treatments*					*Mean*	*p-value*
	T1	*T2*	*T3*	*T4*	*T5*		
Chicken market price	1079[a]	1079[a]	1079[a]	1079[a]	1079[a]	1079	-
Commercial feed cost	758[a]	638[a]	390[b]	220[b]	0[c]	401	0.001
Homemade feed cost	0[d]	156[c]	287[b]	486[a]	534[a]	293	0.001
Total feed cost	758	795	678	706	534	694	0.1301
Total variable cost	1837	1874	1757	1785	1614	1773	0.1301
Gross income	3238[a]	3516[a]	2600[ab]	2643[ab]	1373[b]	2674	0.0057
Total return	2159[a]	2437[a]	1520[ab]	1564[ab]	294[b]	1595	0.0057
Net return	322[a]	563[a]	-237[b]	-221[b]	-1319[c]	-178	0.0027

Note: T1 - 0% low-cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low cost diet; different letters show significant differences.

Reduction in feed cost per kg of weight gain of chicken fed commercial rations had been similarly reported by Mikulski et al (1997) and Ajaja et al (2003). The observed reduction in feed cost per kg weight gain of chicks that consumed the commercial ration may probably be due to an increase in average daily feed intake (ADFI), improved feed efficiency, and utilization, and improved average daily weight gain (ADWG) of the chicks.

Table 8

Economic feasibility of least cost diet for Sasso and indigenous chicks in each treatment

Parameters cost (in Ethiopian birr)	*Breeds*										*Mean*	*p-value*
	Sasso T-44 breed					*Indigenous ecotype*						
	T1	*T2*	*T3*	*T4*	*T5*	*T1*	*T2*	*T3*	*T4*	*T5*		
Chick costs	929.0[a]	929.0[a]	929.0[a]	929.0[a]	929.0[a]	150.0[b]	150.0[b]	150.0[b]	150.0[b]	150.0[b]	539.5	0.001
Feed cost	354.8[a]	358.9[a]	311.2[a]	322.2[a]	245.6[a]	24.5[b]	38.7[b]	28.1[b]	31.2[b]	21.9[b]	173.7	0.002
Total variable cost	1283.8[a]	1288.0[a]	1240.2[a]	1251.2[a]	1174.5[a]	174.5[b]	188.6[b]	178.1[b]	181.2[b]	171.9[b]	713.2	0.001
Gross income cost	3043.3[a]	3336.6[a]	2460[ab]	2213[ab]	1283.3[b]	151.6[c]	180.0[c]	113.3[c]	110.0[c]	90.0[c]	1298	0.001
Total return	2114.3[a]	2407.6[a]	1531[ab]	1284[b]	354.3[c]	1.6[d]	30[d]	-36.7[d]	-40[d]	- 60[d]	758.6	0.001
Net return	830.5[a]	1119.6[a]	290.8[b]	33[c]	-820.2[d]	-173[d]	-159[d]	-215[c]	-221[c]	-231.9[c]	45.4	0.003

Note: T1 - 0% low-cost diet; T2 - 25% low-cost diet; T3 - 50% low-cost diet; T4 - 75% low-cost diet and T5 - 100% low cost diet; different letters show significant differences.

Conclusions. It is evident from the results obtained in this study that the homemade ration can be included in the commercial ration of Sasso starter diets at a 50% level without adverse effects on growth performance and to enhance cost reduction of feed per kg of chicken weight gain. The profitability and growth performance of the indigenous ecotypes were decreased when the level of homemade ration increased. Hence, homemade ration for indigenous ecotypes had argumentative effects on growth performance of the chicken.

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Conflict of Interest. The authors declare that there is no conflict of interest.

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